WHAT IS CLAIMED IS:

1.   A system for detecting radiation, comprising:

a cell comprising a medium having a plurality of states, the cell operable to:

5   receive a first laser drive field having a frequency approximately equivalent to a transition frequency between a first state and a second state of the plurality of states;

receive a second laser drive field having a

10   frequency approximately equivalent to a transition frequency between the first state and a third state of the plurality of states;

receive an infrared field having a frequency approximately equivalent to a transition frequency

15   between the third state and a fourth state of the plurality of states, the medium operable to have a transition between the second state and the third state substantially forbidden to support optimal coherence on the transition between the second state and the third

20   state; and

upconvert the infrared field to generate a detectable field having a frequency approximately equivalent to a transition frequency between the second state and the fourth state of the plurality of states;

25   and

a detector operable to detect the detectable field.

2.   The system of Claim 1, wherein the cell is operable to continuously upconvert the infrared field to

30   generate the detectable field.

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3. The system of Claim 1, wherein:

an intensity of the first laser drive field is of the order of a saturation intensity of a transition between the first state and the second state; and

5   an intensity of the second laser drive field is of the order of a saturation intensity of a transition between the first state and the third state.

4. The system of Claim 1, wherein:

10   the first laser drive field is approximately detuned from a first resonance frequency of the medium; and

the second laser drive field is approximately detuned from a second resonance frequency of the medium.

15   5. The system of Claim 1, wherein:

a detuning of the first laser drive field is approximately equivalent to a linewidth associated with a transition from the first state to the second state; and

a detuning of the second laser drive field is
20   approximately equivalent to a linewidth associated with a transition from the first state to the third state.

6. The system of Claim 1, wherein:

a nonlinear susceptibility of the medium at the
25   frequency of the infrared field is approximately equal to a linear susceptibility of the medium at the frequency of the infrared field; and

a nonlinear susceptibility of the medium at the frequency of the detectable field is approximately equal
30   to a linear susceptibility of the medium at the frequency of the detectable field.

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7.   The system of Claim 1, wherein an angle between a first propagation direction of the first laser drive field and a second propagation direction of the second laser drive field is less than two degrees.

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8.   The system of Claim 1, wherein the cell comprises a molecular vapor.

9.   The system of Claim 1, wherein the cell
10 comprises an atomic vapor.

10. A system for detecting radiation, comprising:

a cell comprising a semiconductive medium having a plurality of levels, the cell operable to:

5   receive a laser drive field having a frequency approximately equivalent to a transition frequency between a first level and a second level of the plurality of levels;

receive an infrared field having a frequency approximately equivalent to a transition frequency
10   between the second level and a third level of the plurality of levels, the medium operable to have a transition between the first level and the second level partially forbidden to support an optimal coherence on the transition between the first level and the second
15   level; and

upconvert the infrared field to generate a detectable field having a frequency approximately equivalent to a transition frequency between the first level and the third level; and
20   a detector operable to detect the detectable field.

11. The system of Claim 10, wherein the cell is operable to continuously upconvert the infrared field to generate the detectable field.

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12. The system of Claim 10, wherein a photon energy of the laser drive field is less than a transition energy between the first level and the second level by approximately 10 to 20 meV.

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13. The system of Claim 10, wherein:

the first level comprises a hole level;

the second level comprises a first electron level; and

5   the third level comprises a second electron level.

14. The system of Claim 10, wherein:

the first level comprises an electron level;

the second level comprises a first hole level; and

10   the third level comprises a second hole level.

15. The system of Claim 10, wherein the cell comprises a plurality of quantum dots.

15   16. The system of Claim 10, wherein the cell comprises a stack of approximately ten to twenty layers of quantum dots.

17. The system of Claim 10, wherein the cell

20 comprises a plurality of quantum wells.

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18. A method for detecting radiation, comprising:

receiving a first laser drive field at a cell comprising a medium having a plurality of states, the first laser drive field having a frequency approximately equivalent to a transition frequency between a first state and a second state of the plurality of states;

receiving a second laser drive field having a frequency approximately equivalent to a transition frequency between the first state and a third state of the plurality of states;

receiving an infrared field having a frequency approximately equivalent to a transition frequency between the third state and a fourth state of the plurality of states, the medium having a transition between the second state and the third state substantially forbidden to support optimal coherence on the transition between the second state and the third state;

generating, by upconverting the infrared field, a detectable field having a frequency approximately equivalent to a transition frequency between the second state and the fourth state; and

detecting the detectable field.

19. The method of Claim 18, further comprising generating the detectable field by continuously upconverting the infrared field.

20. The method of Claim 18, wherein:

an intensity of the first laser drive field is of the order of a saturation intensity of a transition between the first state and the second state; and

an intensity of the second laser drive field is of the order of the saturation intensity of a transition between the first state and the third state.

5   21.   The method of Claim 18, further comprising:

approximately detuning the first laser drive field from a first resonance frequency of the medium; and

approximately detuning the second laser drive field from a second resonance frequency of the medium.

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22.   The method of Claim 18, further comprising:

detuning of the first laser drive field, the detuning being approximately equivalent to a linewidth associated with a transition from the first state to the

15   second state; and

detuning of the second laser drive field, the detuning being approximately equivalent to a linewidth associated with a transition from the first state to the third state.

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23.   The method of Claim 18, wherein:

a nonlinear susceptibility of the medium at the frequency of the infrared field is approximately equal to a linear susceptibility of the medium at the frequency of

25   the infrared field; and

a nonlinear susceptibility of the medium at the frequency of the detectable field is approximately equal to a linear susceptibility of the medium at the frequency of the detectable field.

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24.   The method of Claim 18, wherein an angle between a first propagation direction of the first laser

drive field and a second propagation direction of the second laser drive field is less than two degrees.

25. The method of Claim 18, wherein the cell comprises a molecular vapor.

26. The method of Claim 18, wherein the cell comprises an atomic vapor.

27. A method for detecting radiation, comprising:

receiving a laser drive field at a cell comprising a semiconductive medium having a plurality of levels, the laser drive field having a frequency approximately equivalent to a transition frequency between a first level and a second level of the plurality of levels;

receiving an infrared field having a frequency approximately equivalent to a transition frequency between the second level and a third level of the plurality of levels, the medium operable to have a transition between the first level and the second level partially forbidden to support an optimal coherence on the transition between the first level and the second level; and

upconverting the infrared field to generate a detectable field having a frequency approximately equivalent to a transition frequency between the first level and the third level; and

detecting the detectable field.

28. The method of Claim 27, further comprising continuously upconverting the infrared field to generate the detectable field.

29. The method of Claim 27, wherein a photon energy of the laser drive field is less than a transition energy between the first level and the second level by approximately 10 to 20 meV.

30. The method of Claim 27, wherein:

the first level comprises a hole level;

the second level comprises a first electron level; and

5   the third level comprises a second electron level.

31. The method of Claim 27, wherein:

the first level comprises an electron level;

the second level comprises a first hole level; and

10   the third level comprises a second hole level.

32. The method of Claim 27, wherein the cell comprises a plurality of quantum dots.

15   33. The method of Claim 27, wherein the cell comprises a stack of approximately ten to twenty layers of quantum dots.

34. The method of Claim 27, wherein the cell
20   comprises a plurality of quantum wells.

35. A system for detecting radiation, comprising:

means for receiving a first laser drive field, a second laser drive field, and an infrared field and for generating a detectable field by upconverting the

5   infrared field, the receiving and generating means having a plurality of states;

means for detecting the detectable field; and

wherein:

the first laser drive has a frequency approximately

10 equivalent to a transition frequency between a first state and a second state of the plurality of states;

the second laser drive has a frequency approximately equivalent to a transition frequency between the first state and a third state of the plurality of states;

15 the infrared field has a frequency approximately equivalent to a transition frequency between the third state and a fourth state of the plurality of states;

the generated detectable field has a frequency approximately equivalent to a transition frequency

20 between the second state and the fourth state; and

the medium has a transition between the second state and the third state substantially forbidden to support optimal coherence on the transition between the second state and the third state.

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36. A system for detecting radiation, comprising:

a cell comprising a medium having a plurality of states, the cell operable to:

receive a first laser drive field having a
5   frequency approximately equivalent to a transition frequency between a first state and a second state of the plurality of states, the first laser drive field having an intensity of the order of a saturation intensity of a transition between the first state and the second state,
10   a detuning of the first laser drive field is approximately equivalent to a linewidth associated with the transition from the first state to the second state;

receive a second laser drive field having a frequency approximately equivalent to a transition
15   frequency between the first state and a third state of the plurality of states, the second laser drive field having an intensity of the order of the saturation intensity of a transition between the first state and the third state, a detuning of the second laser drive field
20   is approximately equivalent to a linewidth associated with the transition from the first state to the third state;

receive an infrared field having a frequency approximately equivalent to a transition frequency
25   between the third state and a fourth state of the plurality of states, the medium operable to have a transition between the second state and the third state substantially forbidden to support optimal coherence on the transition between the second state and the third
30   state, an angle between a first propagation direction of the first laser drive field and a second propagation direction of the second laser drive field being less than two degrees; and

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continuously upconvert the infrared field to generate a detectable field having a frequency approximately equivalent to a transition frequency between the second state and the fourth state; and

5   a detector operable to detect the detectable field.